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Mobilizing The Open University: Case Studies in Strategic Mobile Development

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Introduction

This paper presents an overview of many activities undertaken in the Mobile Learner Support project area in The Open University (OU). Please note that while many of the project strands involve strategic development that is embedded in the OU's institution-wide teaching and learning systems, some of the data and findings we hope will be of use to others undertaking work in related areas. In addition to the core work in implementing a Mobile VLE and associated resources, an overview of related mobile audio eAssessment and eBook format development project strands are given, leading to development of a blend of web application software and native or client applications.

The OU delivers significant proportions of online content and collaboration as part of its supported open learning distance education model to over 200,000 part-time students at any given time. In particular, over the past 4 years, adapting open source technologies for around 600 course websites has delivered the requirement to support course activities for up to 4,700 students per course cohort with a corresponding 250 variations of a single course to provide online tutorial spaces. The OU has also throughout its history adapted to increasingly flexible and personalised modes of delivering and interacting with multimedia and audiovisual content as part of a blended approach, most recently aiming to disaggregate content and allow remixing through its open educational resources initiative.

For updates on the Mobile Learner Support project, please visit <http://www.open.ac.uk/blogs/mLearn>

Keywords

Mobile VLE; Webstats; eAssessment; eBooks; Applications

Mobile VLE Project

The majority of course websites are delivered by the OU's adapted version of the Moodle Virtual Learning Environment (VLE or LMS) as part of a Managed Learning Environment integrating with student data, assessment and library systems.

It is the increasing level of student activity and usage of course materials while mobile that has steered the latest institution-wide initiative to further improve teaching and learning provision. Many OU course online elements provide much more than a set of resources, through embedding collaborative activities. The entry point for many students is via the main 'StudentHome' portal – and the usage of this, particularly by mobile devices, has been tracked for some time as illustrated in the webstats below (Figure 1).

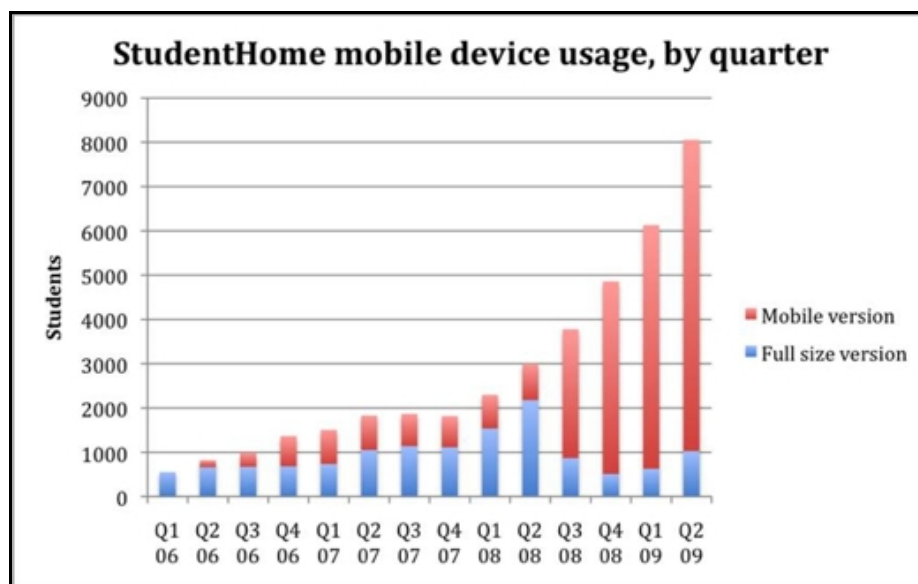


Figure 1: StudentHome Usage

In addition to the quarterly data, mobile usage increased again to 5,253 unique students in September 2009 and 5,701 in October 2009, which, while only around 2% of total traffic, remains a significant number of individuals to cater for. Early development provided a link to the mobile version of StudentHome, and since July 2008 the site has been redeveloped to incorporate device detection, while still allowing higher-end mobile browsers to view 'full' content if so desired.

Reinforcing the increasing trend shown in these webstats is the anecdotal student feedback from face-to-face sessions, including residential schools, as well as more formal end-of-course reporting indicating that students are using online or electronic course materials in unanticipated ways. Many of these uses include the intention to support learning while mobile, or where students are away from their 'normal' or regular studying environment.

The primary aim of this project is to optimise relevant web-based content for a mobile audience, both by enabling better access to online activities and to implement a targeted design for devices. This work is informed by student surveys into current mobile behaviours and expectations for study. Following the initial build, onsite mobile usability (Nielsen Norman Group, 2009; Schusteritsch, Wei, & LaRosa, 2007; see also www.useit.com) reviews, focus groups, and interviews where students are asked to complete educational tasks and interact with the Mobile VLE will also take place.

A significant driver prior to redesign work was to enable interaction - not just mobile browsing - via providing effective mobile text entry methods, which was somewhat hampered by WYSIWYG or rich text editor web plugins geared for desktop browsers. A solution was delivered to allow text entry in collaborative tools so that the rich text HTML editors degrade gracefully for mobile users on a variety of devices and browsers (Figure 2).



Figure 2: Interoperable HTML and Plain Text Entry

The implementation of a mobile-optimized VLE through Moodle involved stakeholder consultation from course design perspectives and drawing up wireframes, while also obtaining feedback from students as well as system reports on the areas of course websites that are used most heavily and are most appropriate for accessing while mobile. We have taken the approach to tailor the interface for access by various mobile browsers, not trying to serve all modules or content, or push all content down the mobile 'channel', nor limiting to specific clients, e.g. Java or text-only views ([Mobile Moodle](#); [Moodle for Mobiles](#); see also [mle.sourceforge.net](#)).

A quantitative student survey was drawn up, accessed by the 'StudentHome *mobile*' portal and a mobile-optimised survey engine (SurveyGizmo) to maintain usability from devices. The survey questions covered current usage of devices, StudentHome mobile, preferences for display of content on mobiles, and the order of priority given to aspects of mobile service provision in the future. This initial student survey to a self-selecting group of current mobile users was then followed by a set of optimised designs, which will be made available for wider input and comment before a staged implementation starting in Spring 2010.

The self-selecting student survey ran for just over a month until September 1st, 2009, with 196 complete responses from current student users of StudentHome mobile and some 28 partial responses. For device usage, the following were reported: 66% on 3G or '3G+' connections, 85% on Smartphones or 'Touch phones', and 66% of respondents typically changing device within 2 years. For mobile usability, 41% preferred top-level navigation, 38% included inline with content, and 52% preferred indicators against every link to inform whether further resources were mobile-optimized or not. 47% of mobile users currently visit the websites once a week or more, with a regular focus on messages (80%) or the study planner (58%). The main common qualitative comment was to improve the immediacy on reporting of assignment scores (rather than needing to go to the assignment handler system). This has now been addressed in a separate integration and redesign project, which should be available to students in the near future.

With regard to prospective use of a mobile-optimised course website on the VLE, the students surveyed reported that they would actually like to access full online text (59%), and so the challenge is in how best to display this. A design with the current block or week of the study planner at its heart seems the best approach, aiming for a single-column layout that will work on the variety of devices we know students are using to access OU content. In addition, students prefer to link between mobile and desktop use by a series of flags (58%) or 'to do' items that can be ticked off - particularly for activities that can only be completed through complex online interaction.

The course website features on the VLE that could be made available for use while mobile are star-rated below (Figure 3).

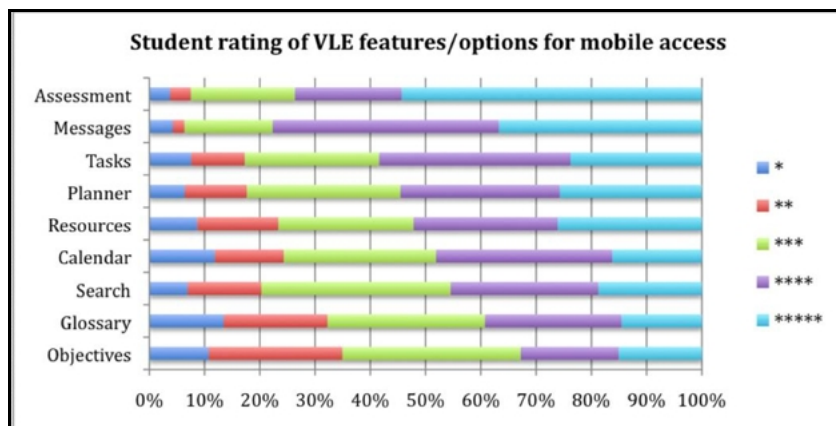


Figure 3: Student Survey Ratings

In response, the design and development team are prioritizing the optimization of the Assessment and Messaging (including Forums) modules, using the study planner 'tick box' and including relevant resources. Subsequent work includes the repositioning of a side navigation bar on relevant resource and activity pages, evaluating and staging the implementation of optimized views for other collaborative tools.

To better monitor Mobile VLE activity post-release, a related VLE Reporting project is also under way, comparing platform and device statistics. Device detection for more complex features is an issue we hope will be addressed through use of common header files that can be used by other online and course websites, including VLE tool modules (Figure 4).

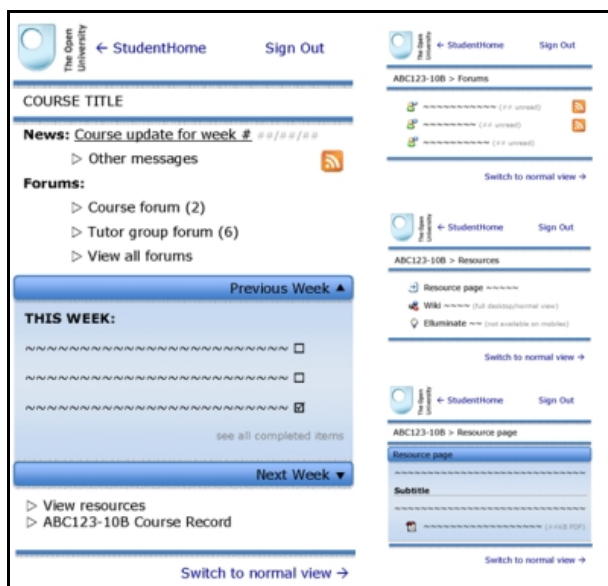


Figure 4: Mobile VLE Optimised Layout Wireframes

To inform application development, taking some related research by the OU Library further (Mills, 2009), the situation with respect to downloading apps has changed recently, not least through a growing number of multiple platform App Stores, markets and similar venues during 2008 and 2009. Our mobile users

selected from the following: 74% of respondents know that downloading apps is possible on their devices and know how to do it. 68% are happy to download 'over-the-air'; 60% are happy to download via a computer. Most importantly for the OU however is that 89% would be happy to download an OU app and 77% would be happy to download 'helper apps'.

As a result, exploratory work is now under way to implement a cross-platform solution in creating a 'shell' or 'umbrella' application that will allow students to add in app modules or services as these are made available and use them offline where appropriate. This work is in addition to specific subject-based and public-engagement app creation already under way elsewhere in the university (see for example the work by [KMi's Mobile Innovations Group](#))

Audio eAssessment Via Mobile Devices

In the interests of exploring where mobile devices can provide a more flexible approach to course study, some separately commissioned work has been conducted by means of a research study into adapting use of current DVD-ROM materials to a mobile framework.

To inform reuse of course materials, application development, and innovation in eAssessment methods currently employed by the OU, a dedicated research study (Demouy, Eardley, Kukulska-Hulme, & Thomas, 2009) was undertaken – initially at a small scale to evaluate efficacy. The opportunity arose to work with Learnosity, specifically to adapt some 'Voice Response' solutions to provide (initially formative) assessment activities via audio to improve speaking and listening in a foreign language.

By adapting some French DVD-ROM content, it was possible to provide a phone call-based system (akin to phone banking menu-based systems) that gives students instructions and a stimulus in the target language, a prompt for the student response, and then an opportunity to record, compare the response with a model answer, and review the activity.

In some cases, it was also possible to effectively create a structured conversation, where students could hear their response interleaved with the pre-recorded samples. To gauge the efficacy of this model, a small sample group from a current intermediate-level course was recruited and expected to carry out these activities that ran parallel to relevant course material, also allowing comparison with DVD-ROM content. Weekly questionnaires were provided and qualitative feedback was also sought via built-in systems in the 'voice response' phone call, and by individual contact towards the end of the initial study period.

In the Intermediate French research study, a variety of activity types were assembled, some additional prompts needed recording, and some audio segments from the DVD-ROMs required editing. The activity types include grammar drill, dialogue, oral presentation, pronunciation-intonation, and listening. A total of 34 examples were provided for students to work through optionally, with a crib sheet detailing links to course materials and code numbers required by the voice response system. A lo-call (i.e. cheap tariff) 0330 phone number was used, and students could re-record answers and attempt the same activity multiple times if desired. In addition to using the phone to interact, students could also subsequently log on to an online system to review their input, including the ability to use an audio player (with visualisation) to playback and pause. Since the initial study, the exercises have also been opened up for all students on the course to use as revision material, indicating a 'top 10' set of activities as a starting point.

Despite less activity on the Intermediate French research study than expected, somewhat due to timing, the potential for the voice response system is being considered, particularly for use in audio recording and further trials in an upcoming course later in 2009. In particular, the potential to offer a more natural (i.e. less scripted) conversation approach is of interest to the Languages teams – getting closer to a reviewable real-time role-playing model than previously available from a distance.

Some student feedback that has been taken forward is the need to support pausing and replaying audio for long and complex listening segments and a concern over call costs. These are also being addressed in web and client application development, allowing synchronisation of audio files for review, and potentially later recording via VOIP or local device recording and subsequent upload. Integration with

Skype has also been added and initial work is ready for trial in enabling student review of progress via an iPhone app as well as (desktop) web browsers.



Figure 5: Learnosity Online and App-Based Audio Activity Review

Audio eAssessment is at an early stage in moving beyond use of audiovisual material only as a stimulus for text-based analysis and comment, which is giving rise to institutional knowledge-sharing in how rich media and participatory video can be used with our (mobile) learners. Further reviews are underway to evaluate which of the many methods employed by the university to date best map against the range of different listening and speaking activities, where mobile solutions may suit many but not all of our students.

Structured Content and eBook Delivery

A longstanding aim of XML, standards-based content delivery onto our websites concerns packaging of content for flexible use, including offline. For some time, the OU has provided PDF versions of printed study materials, but the usage of these has largely been limited to desktop on-screen reading, printing, and minor customization. In later and more accessible versions, some user highlighting and annotation has been possible to offer a degree of personalization, but this is only available on desktop applications. Mobile device support mostly results in the ability to view content only, usually maintaining printed pagination, although some zooming and reflowing of text at larger font sizes is possible.

Trials of some alternative approaches and formats were undertaken and reviewed as part of teacher professional development materials provided through the DEEP-ER research study (Power and Thomas, 2007; see also [here](#)). The eBooks created were a result of a handcrafted approach, using dedicated authoring tools, but the feature set provided by the formats was evaluated, and differences between implementations on multiple devices have since been noted.

Using structured content documents to generate multiple outputs for multiple devices and applications was initiated with a technical review of eBook formatting and usability. Feature sets of the different formats and popular applications were considered along with technical flexibility of the format, particularly in relation to user annotation, internal hyperlinking, image/thumbnail handling, and cross-referencing to other sources such as dictionaries (see Figure 6).

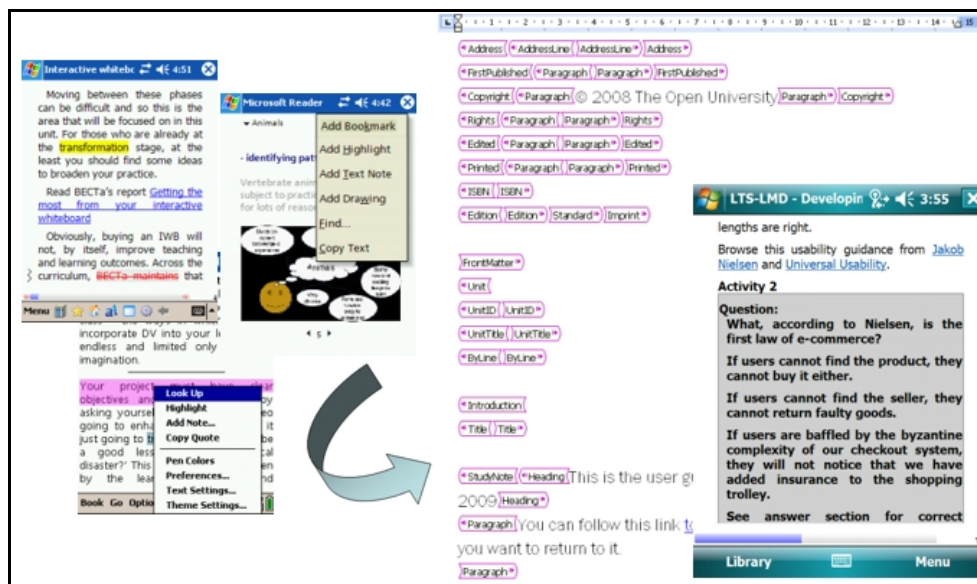


Figure 6: eBook User Personalisation and Structured Content

Technical evaluation of the eBook formats indicated Mobipocket as a suitable format and entry point to Open eBook or ePub format development. Since the early review, XSLT work has been redeployed to more fully support the open standard in response to recent uncertainty over the viability of Mobipocket on a broad range of newer devices as a result of Amazon Kindle development. Work is now under way in providing signposting within structured content available online, where the narrative includes complex or collaborative exercises that would need to be completed separately from offline material.

To embed ePub creation as part of the VLE Structured Content workflow or pipeline system, additional work is also being undertaken to provide clearer signposting or 'canned text' for printable versions of web pages or eBooks, so that it is clear that some activities need to be done online. A related feature request to this is to provide keyframes of video or interactive applets with a similar signposted prompt to access online, while allowing for the future possibility to embed multimedia if devices and apps support these features.

The work initiated in eBook formats parallels that of DAISY talking books as part of a separate [Digital Audio Project \(DAP\)](#), also now followed by device and eBook Reader trials at the OU ([Digilab eBook zone](#)). Library staff in particular have noted that the ePub standard can be used successfully with client software such as Calibre so the user can adapt content more specifically for his/her own device if needed.

Conclusions

At an institutional level it is quite challenging to provide what might be called true 'mobile learning' approaches as defined in smaller-scale projects to date (Kukulska-Hulme & Traxler, 2005), in many cases mediated by some face-to-face activity. To better communicate, integrate, and enhance current teaching and learning provision for the mobile learner, services and support have been targeted, initially aiming to meet some of our existing mobile users halfway. This development work is now well under way. The

intention then is to spur other opportunities and developments to be integrated, repurposed, and accessed more widely rather than existing in isolation.

Another challenge is that 'mobile learning', as it covers such a wide spectrum of activity, can be difficult to communicate to wider groups of staff. Embedding staff development opportunities are important (Mills & Thomas, 2008; Needham & Ally, 2008), supplementing an exploratory approach where a 'mobile angle' can be applied to existing activities as just another method of achieving the same result. In the above eAssessment case, tying the results of new approaches into formal summative credit requires consideration that the methods maintain parity and that students are not disadvantaged, whatever method they choose to employ.

As more students and staff become exposed to the use of devices and aware that they can study elements of their courses while mobile, specific learning objectives can be delivered and tailored course content explored further. In particular, with more and more devices having on-board audiovisual playback and recording coupled with uploading capabilities, greater use of this medium to support and detail the learning journey is being considered, following prior work in educational podcasting ([KMi iTunesU Research](#)) and participatory video.

References

- Demouy, V., Eardley, A., Kukulska-Hulme, A., & Thomas, R. (2009, September). *The L120 Mobile Project*. Presentation at MLASLA1, Toledo, Ohio, USA.
- Kukulska-Hulme, A., & Traxler, J. (Eds., 2005). *Mobile learning: A handbook for educators and trainers*. London, UK: Routledge.
- Mills, K. (2009). *M-Libraries: Information use on the move. A report from the Arcadia Programme*. Cambridge, UK: University of Cambridge. Retrieved from http://arcadiaproject.lib.cam.ac.uk/docs/M-Libraries_report.pdf
- Mills, K., & Thomas, R. (2008, October), Mobile Digiquest: Developing rich media reflective practitioners, Paper presented at Handheld Learning 2008, London, UK. Retrieved from <http://oro.open.ac.uk/12833/>
- Needham, G., & Ally, M. (Eds., 2008). *M-libraries: Libraries on the move to provide virtual access*, London, UK: Facet Publishing.
- Nielsen Norman Group (2009). Usability of mobile websites: 85 design guidelines for improving access to web-based content and services through mobile devices. Available at <http://www.nngroup.com/reports/mobile/>
- Power, T., & Thomas, R. (2007). The classroom in your pocket? *Curriculum Journal*, 18(3), 373–388.
- Schusteritsch, R., Wei, C., & LaRosa, M. (2007). Towards the perfect infrastructure for usability testing on mobile devices. In B. Begole, S. Payne, E. Churchill, R. St. Amant, D. Gilmore, & M. B. Rosson (Eds.), *CHI '07 Extended Abstracts on Human Factors in Computing Systems*, (pp. 1839-1844). New York: ACM. doi: <http://doi.acm.org/10.1145/1240866.1240908>